

Ionic liquids having $[\text{N}(\text{CF}_3)_2]^+$ anions

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This is a 371 application of PCT/EP03/12811 filed November 17, 2003.

The present invention relates to salts comprising bis(trifluoromethyl)imide anions and saturated, partially or fully unsaturated, heterocyclic cations, to a process for the preparation thereof, and to the use thereof as ionic liquids.

Ionic liquids or liquid salts are ionic species which consist of an organic cation and a generally inorganic anion. They do not contain any neutral molecules and have melting points of below 373 K. A multiplicity of compounds which are used as ionic liquids are known in the prior art. In particular, they are also the subject-matter of a series of patents and patent applications.

Thus, solvent-free ionic liquids were disclosed for the first time by Hurley and Wier in a series of US patents (US 2,446,331, US 2,446,339 and US 2,446,350). These "salts which are molten at room temperature" comprised AlCl_3 and a multiplicity of n-alkylpyridinium halides.

US 5,827,602 describes hydrophobic ionic liquids having a wide electrochemical window for use as electrolytes in batteries. These salts have certain 5- or 6-membered heterocyclic cations and polyatomic anions having a van der Waals radius of greater than 100 \AA^3 , for example halogenated alkylsulfonimides, mono- or diperfluorosulfonates, fluorinated alkylfluorophosphates.

In addition, some review articles on this topic have been published in recent years (R. Sheldon "Catalytic reactions in ionic liquids", *Chem. Commun.*, 2001, 2399-2407; M.J. Earle, K.R. Seddon "Ionic liquids. Green solvent for the future", *Pure Appl. Chem.*, 72 (2000), 1391-1398; P. Wasserscheid, W. Keim "Ionische Flüssigkeiten – neue Lösungen für die Übergangsmetallkatalyse" [Ionic Liquids – Novel Solutions for Transition-Metal Catalysis], *Angew. Chem.*, 112 (2000), 3926-3945; T. Welton "Room temperature ionic liquids. Solvents for synthesis and catalysis", *Chem. Rev.*, 92 (1999), 2071-2083; R. Hagiwara, Ya. Ito "Room temperature ionic liquids of alkylimidazolium cations and fluoroanions", *Journal of Fluorine Chem.*, 105 (2000), 221-227).